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VOLUME VI

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UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

NEWS LETTER

FOR AUGUST 1939

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ADMINISTRATION

H. F. Willard

H. F. Willard, of the Division of Foreign Plant Quarantines, died in Honolulu on August 18, 1939. Mr. Willard was born in Neillsville, Wis., on February 21, 1884. Following his graduation from the Massachusetts Agricultural College in 1911, he went to Honolulu to become an instructor in Mills College, a missionary school for Polynesian and Oriental students. After serving with credit at that institution, he resigned to become a homesteader of Government land in and about Haiku, Island of Maui, and pioneered in the development of pineapple culture on Maui Island. Later he was made foreman of the pineapple cannery erected and operated at Haiku to care for the crops of the homesteaders. In 1916 he returned to Honolulu and became associated with the fruitfly work of the Bureau of Entomology. At first he gave his entire time to the fiscal and inspection phases of the work but later he entered actively into the research problems, particularly those centering on determining the effectiveness of introduced parasites of the Mediterranean fruitfly. A number of excellent papers dealing with parasitization, several in cooperation with C. E. Pemberton, were later published. On July 1, 1928, Mr. Willard was transferred to the Plant Quarantine and Control Administration and from that date until his death was engaged in the enforcement of quarantines affecting the movement of plants and plant products from Hawaii to the mainland.

EDITORIAL OFFICE

Memorandum No. 2. Tables

Tables are used when the data can be presented more concisely or more clearly in this way than in the text. In the manuscript each table should immediately follow the paragraph in which it is first referred to, unless this reference is incidental and not in the place where introduction of the table logically comes. In general, the same data should not be presented in both the text and tables, except for purposes of comparison or interpretation.

A table must have three or more columns and two or more lines. Two columns of data comprise a tabulation, which is not numbered and may or may not have a heading.

In arranging data in tables consideration should be given both to conciseness and ease of comparison. Occasionally it is necessary to repeat columns of data in several tables, but this should be avoided unless clarity requires it. Do not cover too many points in a single table, but do not make two or more tables when the data can be combined to advantage.

A table consists of (1) a heading or title, (2) box or column headings, (3) the stub, (4) the body of the table, and (5) footnotes.

The heading or title should indicate clearly, accurately, and briefly the principal items of information to be found in the table. It should be definite rather than general. All tables should be numbered and have headings.

The box or column headings should show the elements or kind of data to be found in the column below, with the units expressed below the box. (The style varies in outside publications.) In the stub column the unit is placed in the box heading. Be sure the unit is clearly associated with the box heading.

The stub is the extreme left-hand, or first, column of the table, and should contain the main items about which data are presented or the elements being compared. Sometimes a stub consists of more than one column. Lack of understanding of which elements should be placed in the column headings and which in the stub is one of the most common difficulties in table making, and leads to awkward tables that are hard to follow.

The body of the table comprises the data that are being presented.

Footnotes are used to give additional information about certain data or groups of data necessary for their interpretation, or which represent exceptions to the other data. They should not be used to explain the procedure or give details of an entire experiment; such information belongs in the text.

When the data of a table fall in distinct groups, such divisions may be indicated (a) by center heads, (b) by flush heads in the stub followed by indented items, or (c) by dividing the stub into two or more columns and tying up with braces.

Tables should be ruled to set off the column headings from the body, and also at the bottom of the table but above the footnotes; but there should be no rules between individual lines in the body of the table.

FRUIT INSECT INVESTIGATIONS

Pear psylla in Pacific Northwest.--E. J. Newcomer, of the Yakima, Wash., laboratory, reports that this insect, which hitherto has been known to occur only in the Eastern States, was recently found by Washington State workers to be present east of Spokane. It is not known how the insect found its way to the Northwest. Surveys so far reported record infestation only from a rather limited area in the vicinity of Spokane. In addition to the survey made by Mr. Newcomer, preliminary surveys have been made by a number of State workers. At a conference of State and Federal officials, held at Spokane on August 29, plans were made for a more detailed cooperative survey to determine whether the psylla has found its way to any of the main pear-producing areas of the Pacific Northwest.

Some codling moth larvae remain in hibernation throughout summer.--M. A. Yothers, of the Yakima laboratory, reports finding, in August 1939, hibernating codling moth larvae in the soil attached to or near tree trunks. These larvae have been there since the fall of 1938, and show no indication of pupating this season. Literally hundreds have been found in a neglected orchard, which had a large crop last year but has practically no crop this year. They can be readily distinguished from this year's worms, their white color contrasting strongly with the pinkish color of the new worms.

Fumigation of prop poles for killing hibernating codling moth.--Following up a complaint by a local grower that codling moth injury in past years appeared to be most severe around stacks of poles used the previous season for bracing limbs of apple trees, D. W. Hamilton, of the Poughkeepsie, N. Y., laboratory, made a study of the problem. Because of excessive labor costs, the grower deemed it inadvisable to remove these poles from the orchard and fumigation experiments were conducted on 2 stacks, each consisting of approximately 1,000 poles cut from saplings or young trees, many containing rough bark. These were stacked in "wigwam" fashion. Each pile was about 10 feet wide at the base and 20 feet high, and contained almost 1,000 cubic feet of space. To retain the fumigant, heavy tarpaulins were placed over the poles and held in place by ropes. In order to check results more readily, 5 cheesecloth bags containing codling moth pupae were tacked throughout each stack at various distances from the ground. Hydrocyanic acid gas was used as the fumigant. In 1 stack of poles this gas was generated by placing 1 pound of sodium cyanide eggs in sulfuric acid in 2 battery jars on opposite sides of the base of the stack. In the other stack 2 pounds of calcium cyanide was placed on the ground under the poles. The fumigants were placed at the base of the stacks about 4 p. m. on a still day and the tarpaulins left in place until 8 a. m. the following day. In the stack in which sodium cyanide was used as the source of the gas, the mortality was 100 percent, whereas there was 42 percent survival in the stack treated with calcium cyanide.

Food for rearing raisin moths.--No satisfactory medium for use in rearing larvae of Ephestia figulilella Greg. in the laboratory has been available. Charles K. Fisher, of the Fresno, Calif., laboratory, has made a food which promises to be an improvement over others that have been tried. Four ounces of puppy meal (labeled as a "biologically complete" food), 4 ounces of Zante raisins ("currants"), 2 fluid ounces of honey, and 2 fluid ounces of glycerine were kneaded by hand to form a granular, slowly drying mixture. Larvae of the raisin moth and of the Indian-meal moth (Plodia interpunctella (Hbn.)) grew very rapidly on this diet and the adults were of large size. A suggestion that puppy meal be tried was contributed by G. F. MacLeod, of the University of California. The honey-glycerine moistener was taken from a formula published by M. H. Haydack, of University Farm, St. Paul, Minn.

Storm destroys recently settled scale insects.--Willis Mathis, of the St. Lucie, Fla., laboratory, has recently made observations on the effect of a tropical storm on recently settled scale crawlers. Of 178 young Florida red scales (Chrysomphalus aonidum (L.)) that settled on August 3, all but 15 were destroyed by a tropical disturbance which occurred on August 11, with wind-gust velocities of 60 miles per hour and a precipitation of 2 inches of rain in 24 hours. These insects had been marked and were under observation in connection with biological studies.

MEXICAN FRUITFLY CONTROL

Fruitfly populations in August.--Trap recoveries indicated there was a reduction in August of 86 percent in the population of Anastrepha ludens Loew in the lower Rio Grande Valley of Texas. Of the 166 adults taken, 93 came from 1 property that had been unusually heavily infested earlier in the season. Throughout the latter half of the month only 11 flies were trapped in the entire area. Fruitfly larvae were found on 3 premises in August. Only 6 fruits on these 3 plantings were found to contain larvae and in 2 of them the larvae were dead. The population of Anastrepha serpentina Wied. increased to its highest recorded level in the area during August. Since no known hosts are in the area, their occurrence is of more entomological interest than of economic importance.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Threshing of alfalfa destroys adults of Hypera brunneipennis.--As a resul of the recent discovery by Arizona State officials of the presence of a new weevil pest of legumes, Hypera brunneipennis (Boh.), in the Yuma Valley, Ariz., it became immediately desirable to determine what effect the threshing of alfalf for seed would have upon the survival of adult weevils contained in the hay. As a result of a series of 12 threshing tests made by W. C. McDuffie at Yuma, it was shown that in no case did any live beetles succeed in passing through the threshing machine. Numerous fragments of weevils, placed alive in the hay before threshing, were found both in the dirt-seed and blower outlets of the thresher. It was therefore believed that there was very slight danger, if any, of seed becoming contaminated with live beetles. This is an important question because the Yuma Valley is an important alfalfa-seed producing and shipping area

JAPANESE BEETLE CONTROL

New Dutch elm disease infections located by scouts.--With the discovery of elms infected with the Dutch elm disease in the towns of Beekman, Northeast, and Unionvale, in Dutchess County, N. Y., infections have been found in each of the 20 towns in the county. A diseased tree was found in the town of Kent, Putnam County, the only town in the county that had not heretofore disclosed infection. Also, in August a first-record infection was reported from the towns of Ancram and Livingston, in Columbia County, N. Y. The tree in the town of Ancram was found in a swamp near Ancramdale. This town abuts on the State line where the Connecticut-Massachusetts line joins the eastern border of New York. The Ancramdale tree is only a few miles from Massachusetts. Selective-scouting and intensive sanitation work is being concentrated in the Ancramdale swamp. The 2 Columbia County trees are the northernmost infections found this year. Confirmation of the presence of the disease in 3 elms in the town of Windsor, just east of the city of Binghamton, Broome County, N. Y., disclosed a new isola ed infected area. In Connecticut there was a considerable projection of the infected zone following the location of diseased trees in the towns of Litchfield and Woodbury, Litchfield County. In New Haven County, Conn., first-record infections were reported from the towns of Milford, North Haven, Seymour, Southbur and West Haven. The Woodbury infection, in Litchfield County, is located approx mately 12 miles from the nearest previously known confirmation in the town of Newtown, Fairfield County. The tree in the town of Litchfield is isolated from other known infections. Pennsylvania townships in which confirmed trees were found for the first time in August were as follows: East Rockhill, Haycock, New

Britain, Plumstead, Richland, Springfield, and West Rockhill, in Bucks County; Salisbury and Upper Saucon, in Lehigh County; Smithfield and Stroud, in Monroe County; and Hanover and Lower Saucon, in Northampton County. A first record in Chesterfield Township, Burlington County, N. J., extended the infected zone in that State farther southward. Seven confirmations were determined by the crews working outside of the main infected area during the month. Two of these were found in the Athens, Ohio, area; 3 in Marion County and 1 in Hamilton County, Ind.; and 1 in the Cumberland, Md., area.

Reduced infection in New Jersey.--Results of the Dutch elm disease scouting during the 1939 foliar season show a 32-percent reduction in the number of confirmations in New Jersey, as compared with the confirmations during the same period in 1938. The grand total of confirmations is still much greater than in 1937. Seasonal confirmations for the last three summers were as follows:

County	Confirmations as of--		
	Sept. 3, 1937	Sept. 3, 1938	Sept. 2, 1939
	Number	Number	Number
Bergen	482	1,177	1,119
Burlington	-	-	1
Essex	347	1,454	705
Hudson	4	7	1
Hunterdon	191	1,862	1,103
Mercer	1	685	412
Middlesex	103	484	264
Monmouth	6	23	42
Morris	920	1,342	1,327
Passaic	336	526	254
Somerset	1,048	2,726	1,523
Sussex	16	153	416
Union	382	1,227	441
Warren	62	296	509
Total	3,898	11,962	8,117

Cloudburst scatters logs at burning site.--A sudden rise in a river from a depth of 4 inches to 4 feet nearly marooned a fire tender and washed away a pile of logs being burned near Woodbury, Conn. A Dutch elm disease confirmed tree had been piled on the riverbank and ignited. About 7 p. m. the fire tender watching this and other fires noticed that, although there had been little rain in Woodbury, the river was rising rapidly. By the time the employee could gather up his tools and start for higher ground the water had increased to the height of his waist and he was obliged to wade waist-deep across the flats. From Tuesday morning until Thursday afternoon was occupied in scouting to pick up the wood that was scattered along the riverbank for a distance of about 16 miles. It was necessary to hire a boat and haul some of the logs out of Lake Goar. To make sure that all of the infected tree was recovered, the tree was reconstructed at the burning site.

Per diem scouting force terminated.--Beginning on August 23, the scouting force organized on June 12 and paid from regular Departmental funds was disbanded

The per diem scouts in Connecticut were terminated on August 23, those in New York on August 26, and the Pennsylvania men on August 29. Approximately 1,500 scouts were involved.

Benefit of elm-sanitation work apparent.--Effectiveness of the sanitation program, as carried on in Pennsylvania last winter was evidenced by the absence of confirmed trees within the mile radius of confirmed trees sanitized during the winter season.

Aerial hitchhikers intercepted.--Two inspectors stationed at the Newark, N. J., Central Airport intercepted 264 Japanese beetles that had either flown into the cabins or baggage compartments of outbound transport planes or were being taken into the planes on passengers' clothing or baggage. The heaviest flight occurred on August 2. On that day the inspectors intercepted over 50 beetles that would otherwise have traveled to distant points in the course of the following 24 hours. Numerous interceptions were made each day until August 20, after which the collections dropped to about 3 beetles per day. Most of the interceptions late in the month were from passengers' clothing and golf bags. Tests to determine adult beetle survival at high altitudes were continued, this time with beetles flown from Pittsburgh to Newark, inasmuch as the eastbound flights are at a higher altitude than westbound flights. Beetles were carried on two flights, with a maximum altitude of 9,000 feet. Seven beetles out of a total of 69 beetles transported were dead at the end of the two-hour flight, hardly indicative of any great mortality that could be attributed to the insect's inability to survive at high altitudes. Another inspector was stationed at the Camden, N. J., Airport until August 22 to check the loading and unloading of planes at that point. Beetle flight at Camden was not severe enough to infest planes landing there, nor were any beetles found on passengers' baggage or clothing.

Virginia nursery shipments started.--Several nurserymen on the Eastern Shore of Virginia have started their fall digging and shipping. The services of 1 inspector are required daily at a large peony farm where digging has been started in preparation for shipment of thousands of peony roots, all of which have to be washed free of soil. This establishment recently completed a methyl bromide fumigation chamber to test the adaptability of the fumigant for all types of peony roots. This chamber will not be used for commercial fumigation this year, but will be thoroughly tested and if practical will be used on a commercial scale next year. Inspectors in this district report that a much greater proportion of the trucks moving south via the Cape Charles ferry are properly certified than in previous years. This is attributed to the inspectors stationed at the ferry to warn truckers of the necessity for certification and the closer guarding of the exit highways just south of Norfolk. Inspectors at road stations and mobile inspectors in cars returned 19 trucks to Norfolk for inspection and certification. Twenty-four beetles were removed from products inspected at Norfolk.

Japanese beetles found in Canada and Bermuda.--A report received from the Canadian Plant Pest authorities states that one live Japanese beetle was brought to a Canadian inspector by a gardener who found it feeding on a rose at Yarmouth, Nova Scotia. One live beetle was found in a trap at Lacolle, Quebec, a port of entry for trucks transporting farm products. Another was found in a carload of apples arriving at Toronto from the State of Delaware. Live beetles were also found in a truckload of mixed fruits and vegetables destined to Quebec from New York City. A report dated July 26 from the Bermuda Department of Agriculture states that interceptions of two live Japanese beetles in ship's hold, one in passenger's baggage, and one on Front Street, Hamilton, were made. No beetles had been caught in traps set in the vicinity of the piers where ships from New York dock.

Quarantine activities in Metropolitan Area.--A considerable acreage planted to lima beans in the Riverhead section of eastern Long Island necessitated extensive scouting of beanfields to determine the presence of Japanese beetles. This field scouting was performed in lieu of inspection of large quantities of lima beans. Three banana companies shipping bananas from New York City fumigated 1,427 empty refrigerator cars during the month, prior to loading the bananas under protected conditions. A new door screening arrangement was utilized, while 8 cars were loaded during a moderate beetle flight. Prefumigation of refrigerator cars was discontinued on August 30, since the companies had enough cars ahead to last during the remainder of the season.

New Jersey certifications.--Over 300 truckloads of fruits and vegetables were certified for movement from New Jersey to North Carolina, South Carolina, Georgia, Virginia, and Florida. In South Jersey growers and truckers were unwilling to provide facilities for inspection and certification of the products at the farm or packing shed, preferring to stop at the inspection center at Fredericksburg, Va., for inspection and certification. One South Jersey nurseryman reported that he had trapped approximately 400 quarts of beetles during the summer. An inspector in Monmouth County obtained permission from a number of property owners for treatment of their premises with nematodes and with the milky white disease for control of Japanese beetle grubs.

Maryland nursery infestations.--During the summer three of the largest nurseries in the Maryland regulated area were found slightly infested. Maps of the exact locations where the Japanese beetles were found were prepared preliminary to consideration of a subdivision and reclassification of the nursery units involved. Scout crews also operated outside the regulated areas in Harford, Baltimore, Carroll, and Frederick Counties. Beetles were found in many districts, including a number of heavily infested farms. Considerable checking of stock was necessitated in connection with the removal of the U. S. D. A. Experimental Greenhouses from 12th Street and Constitution Avenue, Washington, D. C., to Beltsville, Md.

Beetle flights on the Delaware River.--On August 16 the stewards on ships arriving at Chester, Pa., stated that when they passed Lewes, Del., beetles flew on the decks in swarms. An eastern wind from the Delaware shore prevailed that day. All banana boats arriving at Piers 5 and 9, North Philadelphia, report that their decks are hosed down after passing through the beetle flight area miles down the Delaware River. Inspections of produce for ships' supplies were curtailed in the Philadelphia area, owing to the rapid departure of all foreign vessels affected by the European war.

Heavy Japanese beetle infestation in Pennsylvania field corn.--An unusuall heavy infestation of the Japanese beetle in field corn in the Horsham, Montgomery County, Pa., area was reported in August. As many as 200 beetles were taken from the silks and tassels of a single corn plant. A farmer at Kinzer, Pa., gathered over 2 bushels of beetles from his corn, then quit in disgust. On a farm near Kirkwood, Pa., 74 beetles were removed from one corn leaf. Starlings were reported as feeding heavily on the beetles in these farm areas.

New England beetle infestations.--The first indication of the presence of the Japanese beetle in White River Junction, Vt., was observed by the district inspector there on August 5. Both sides of one of the avenues were found heavil infested for a distance of about 300 yards. Heavy feeding was observed on grapes, woodbine, and roses. Another infestation numbering several thousand beetles was reported from Brattleboro, Vt. Owners of the invaded properties in Brattleboro are interested in control measures and are planning a trapping campaign next season.

Gypsy moth infestations.--Reports from district inspectors in Massachusett indicate that new gypsy moth egg clusters are numerous in the Quincy district and that nursery infestations have decreased in the Middleboro and Haverhill districts, as compared with last year. From observations in the Cape Cod section of Massachusetts, the district inspector believes that gypsy moth infestation will be heavier there next season. The egg-laying season was about concluded in the Framingham, Mass., district at the end of the month and the number of egg clusters in the vicinity indicates an increased infestation over this summer's comparatively light infestation. Oviposition was still under way at the end of the month in the Bangor, Maine, district. Defoliation of from 75 to 100 percent was reported from points in tho southern and western portions of the Concord, N. H., district.

Heavily infested lumber inspected.--Eighteen egg clusters, 21 larvae, and 84 pupae of the gypsy moth were removed from 5 carloads of lumber inspected in the Rochester, N. H., district. From a single carload inspected at Madison, N. H., there were removed 10 egg clusters, 16 caterpillars, and 74 pupae. The lumber in this load was piled along a woods road in solid hardwood growth in a section heavily infested with the gypsy moth. Prior to the inspection many caterpillars and pupae had been destroyed in the process of grading. It is unusual to find lumber piled in a location that has not been at least partially cleared, as clearing allows the lumber to dry thoroughly and lessens the fire hazard. Among the products offered for inspection and certification during the month were 20 lots containing infestation. From these 38 egg clusters, 22 larvae and 117 pupae were removed and destroyed.

Dry season affects New England nursery shipments.--Inspection and certific tion of nursery stock from New England nurseries was at a low point in August. This was partly due to the long-continued dry season which prevailed in New England, resulting in the killing of nursery stock both on private property and at some of the nurseries. A number of nurserymen used their spraying equipment for several weeks to water growing stock in the field.

FOREST INSECT INVESTIGATIONS

Elm bark beetle attacks healthier appearing trees.--C. W. Collins, of the Morristown, N. J., laboratory, reports that an unusual condition has been noted this year in connection with attack by the smaller European elm bark beetle

(*Scolytus multistriatus* Marsh.) on elm in New Jersey. Adults have penetrated th bark and made egg galleries in trees which are in a healthier condition than those normally attacked, judging from outward appearances. It is probable that such injury is at least partly due to the severe drought that occurred this year in New Jersey and elsewhere in the northeastern section of the United States. The dry weather presumably affected some trees so that the beetles formed egg galleries in material that would not have been suitable for such attack had the rainfall been greater.

Ambrosia beetle transmits Dutch elm disease fungus.--W. D. Buchanan, of the Morristown laboratory, states that the Dutch elm disease fungus (*Ceratostomella ulmi*) has been recovered from adults of the introduced ambrosia beetle (*Xylosandrus germanus* Blandf.) after they had bored into and later left elm logs infected with the fungus. *Ceratostomella ulmi* was also cultured from chips fro elm logs, originally free of the fungus, into which *X. germanus* adults had bored after they had contacted logs infected with the fungus. These experiments were carried on under controlled conditions. While the Dutch elm disease fungus has been isolated from adults of the ambrosia beetle on several occasions, Mr. Buchanan's latest experiments give additional information concerning this insect as a carrier of the organism.

Lyctus adults develop in less than 4 months indoors.--Adults of *Lyctus planicollis* Lec. emerged from seasoned hickory less than 4 months after the hickory was exposed to beetle attacks, according to a report by B. H. Wilford, of the Asheville, N. C., laboratory. On March 18 over 200 *Lyctus* adults were liberated in a can containing shed-seasoned hickory. All of these adults subsequently died and were removed from the container about 1 month after infestation. For the full period the can was kept in a greenhouse, artificially heated until the end of April. Temperature during that time was kept at approximately 80° F. during the day and 50° at night. On July 10 the first emerging adults were observed. On July 12, 52 emergence holes were counted.

Eastern spruce bark beetle survey in Northeast.--T. J. Parr, of the New Haven, Conn., laboratory, reports as follows on the eastern spruce bark beetle situation in New England: "In a survey of mature and overmature spruce stands in blow-down and other areas in the White and Green Mountain National Forests in New Hampshire and Vermont, conducted during the first 2 weeks of August, it was found that the eastern spruce bark beetle (*Dendroctonus piceaperda* Hopk.) is sti on the decline. In some areas in the White Mountains where there were light infestations last year, no insects were found this season. In "The Bowl," a primitive area near Wonalancet, N. H., which apparently was rather heavily infested last year, fewer wind-thrown trees were infested this season than was the case i standing timber in 1938. A permanent sample strip 180 chains long and 3 chains wide in the Green Mountain National Forest had many trees infested in 1937, 8 infested trees in 1938, and but 2 trees infested this year, both of which were wind-thrown. No control measures have been recommended for the White Mountain o Green Mountain National Forest areas this year.

Results of reconnaissance surveys of Black Hills beetle.--The fight again the Black Hills beetle was carried on during July and August in the form of a reconnaissance, or "red top" survey, on six national forests, according to Dwigh A. Hester, of the Fort Collins, Colo., laboratory. In general, the forests examined appeared to be much freer of trees killed by Black Hills beetle than they were last year. It now appears advisable to make a special attempt to clean up areas in which the infestations have been greatly reduced by past control and to treat other small infestations which may be a nucleus of more serious infestations in the future. The Black Hills National Forest is thought to be in the most critical condition. This infestation, although not exceedingly heavy at this time, appears to be very aggressive and is spread over about 100,000 acres of ponderosa pine timber. Extensive surveys to determine the number of infested trees and the size of the areas needing treatment have been recommended for the Black Hills, Medicine Bow, Roosevelt, Pike, Harney, Gunnison, and Cochetopa National Forests. The areas involved will total some 571,340 acres.

Wood borers in rustic log church.--Following the burning of their church in 1934, the trustees of the First Congregational Church of Brewster, Wash., decided that a rustic log building would be an appropriate replacement. In 1935 a rather large rustic log church was constructed of western larch and lodgepole pine. In 1938, the congregation was considerably upset when "sawdust" began to appear on the floor, and in 1939 was even more alarmed when larger quantities of dust, larvae, and adult insects, were found. A larva sent to the duPont Company and then to the Washington, D. C., office of this Bureau was determined as the cerambycid beetle *Haplidus testaceus* Lec. A recent examination of the building, by J. M. Whiteside, of the Portland, Oreg., laboratory, revealed that most of the trouble was in the lodgepole pine rafters, the material for which had evidently been cut from dead trees in a pole stand. Nearly every rafter had been attacked by the beetle and the bark was very loose and housed a large quantity of boring dust which sifted from the emergence holes when the rafters were even lightly tapped. The larvae had mined the outer layers of sapwood and had penetrated the heartwood to a depth of about 1 inch, but had not materially weakened the rafters. Recommendations were made which would stop the activity of the beetles in the rafters. This situation will be followed with interest for several years, because the trustees are desirous of preserving the rustic appearance of the building and are reluctant to remove the bark from the other parts of the church.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Increase in gypsy moth defoliation in New England.--Records of areas defoliated by the gypsy moth in New England are now being checked and tabulated, but complete figures are not yet available. The grand total of acreage defoliate in New England will exceed last year's total by about 150,000 acres. This increase was caused by a considerable increase of defoliation in Maine and a very great increase in New Hampshire and Vermont. There was apparently some decrease in Massachusetts, a marked decrease in Rhode Island, and some increase in defoliation in Connecticut.

Drought has mixed effect on gypsy moth work.--Heavy showers during the fir few days in August ended a period of protracted drought, extinguished several sizable forest fires that were burning in the Northeastern States, and permitted the burning of brush and debris that had accumulated from gypsy moth ground work and thinning operations. This was the first time burning had been possible since early in the spring, in most localities. Thunderstorms, most of which occurred late in the day or at night during the next few days, kept the forests in condition for safe burning but did not interfere materially with the scouting work.

However, the rain that fell during this period was not sufficient to replace the moisture lost during the long dry spell, and hot weather during the latter part of August caused a return of drought. The situation became so serious that most of the small mountain streams and many springs in some localities where gypsy moth work was in progress dried up so completely that good drinking water was almost unobtainable. The prolonged absence of rain permitted the examination of tree growth in extensive swampy areas in Massachusetts and Connecticut, as these areas became completely dried out. It is usually necessary to scout the swamps during the winter, after they are well frozen over.

Gypsy moth scouting work not yet in full swing.--The wide range in development of the various stages of the gypsy moth that may be found at this season is illustrated by the fact that new egg clusters were located during the second week in August in the same woodland area where caterpillars were still extant. When this overlapping of the stages became evident, scouting in that locality was temporarily discontinued. At the end of August gypsy moth scouting work was being done in remote sections of Vermont which are practically inaccessible during the winter, when many of the roads become impassable. While scouting work in Massachusetts is not yet in full swing, some newly deposited egg clusters were found in several of the areas examined east of the barrier zone. Very little scouting has been done in Connecticut since the close of the spraying season, the greater part of the work in that State consisting of patrolling burlap bands at infested sites; however, scouting work will soon be pushed in all States where Federal gypsy moth work is conducted.

Benefits of burlapping work greatly reduced this year.--The full benefit that could be obtained from the burlap bands that were attached to the trees during the latter part of May and in June to trap gypsy moth caterpillars will not be realized this season because of the delay in starting the gypsy moth project. Many of the larvae had reached the pupal and adult stages by the time W. P. A. gypsy moth work could be resumed late in July. No evidence of the gypsy moth was found at the site where an old egg cluster was located during the last scouting season in Johnson Township, Lamoille County, Vt., although many trees were banded and the area was carefully checked.

Assembling cages recover male gypsy moths.--Numerous adult male gypsy moths have been taken from tanglefoot surrounding assembling cages put out in selected towns in Vermont, New York, and Pennsylvania this season. It is evident, from the location of cages where moths were taken in Vermont, that there has recently been considerable windspread of young caterpillars from the heavily infested sections near the Connecticut River into the barrier zone area just north of Rutland, in both Addison and Rutland Counties. In New York State moths have been captured at cages in the town of Esopus, in Ulster County, which borders the Hudson River on the west; at Shawangunk, on the southern edge of Ulster County; at Ramapo, which borders the New Jersey State line in the extreme southwestern portion of Rockland County; and one moth was found at a cage in Woodbury Township, Orange County, located west of the Hudson River and the barrier zone. Moths were also taken at cages placed in eight towns situated within the quarantined area in Lackawanna, Luzerne, Monroe, and Carbon Counties in Pennsylvania.

Pupal collections for assembling cage work greatly reduced.--The annual collection of female gypsy moth pupae was delayed considerably by the discontinuance of W. P. A. work from July 1 to July 20. The moths issuing from these pupae

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are used in the preparation of the attrahent which attracts male moths to assembling cages. The total number of female pupae that it was possible to collect was only slightly more than 80,000. Nearly 36,000 female moths emerged from these pupae and were used in the preparation of slightly less than 1,200 charges of attrahent. These were placed in storage for use in assembling cage work next year. The comparatively small number of charges obtained will restrict the caging program for 1940 to a much smaller amount than has been done during the last few years.

Fences surrounding areas sprayed for gypsy moth are patrolled frequently.- Fences erected around areas sprayed with lead arsenate in June so that livestock could not consume the poisoned foliage, were patrolled at frequent intervals during August to make certain that they remained intact.

Logged-over areas in Green Mountains present scouting difficulties.--Most of the timber has been logged off of many large sections in the Green Mountains of Vermont, leaving extensive areas covered with slash and blown-down trees. Dense thickets of sapling hardwoods and conifers have grown up which are extremely difficult to scout for the gypsy moth, especially when they are located on precipitous slopes. Several gypsy moth scouting crews working in Vermont have encountered these arduous conditions since the resumption of field work this fiscal year.

Gypsy moth quarantine inspector discovers infestation in woodland.--A gypsy moth quarantine inspector who was walking through the woods in order to examine mine props in Spring Brook Township, Lackawanna County, Pa., discovered a gypsy moth infestation in the forest. A preliminary survey indicated the presence of 46 egg clusters. Spring Brook is located near the center of the area quarantined on account of the gypsy moth.

C. C. C. gypsy moth work.--A total of 4,321 6-hour man-days was used in August on gypsy moth work east of the barrier zone under the supervision of this Bureau. The work consisted of a small amount of scouting, some thinning work, and patrolling burlap bands. The burlapping work was finished for this season at the end of August, and much less was accomplished than during the previous year. Burlap was applied to 191,495 trees on 486 acres, and the men patrolling the bands crushed slightly more than 980,000 caterpillars and pupae this season. During the previous season 613,014 trees were banded on 2,153 acres, which resulted in the destruction of more than 7,600,000 gypsy moth caterpillars and pupae. The reduction in the numbers of caterpillars and pupae destroyed was partly due to a diminished infestation in the areas treated and partly to a large decrease in the number of men available for the work. Burlap placed on trees during the previous year was patrolled and turned this year. Most of the burlap was in satisfactory condition, but a small amount had to be replaced and new twine was applied in many cases. So far this fiscal year the C. C. C. crews have worked on 1,369 acres, 331 of which have received thinning operations, and 18,920 gypsy moth egg clusters have been destroyed.

PLANT DISEASE CONTROL

Spread of white pine blister rust.--During the last 2 months several newly infected counties have been reported in the North Central and Southern Appalachia regions. In the North Central region blister rust on white pine was found for the first time in Luce County, Mich. The oldest canker found appeared to be of 1934 origin. Rust was reported for the first time from Oscoda County, Mich., the disease being found on *Ribes cynosbati*. In Minnesota infection was found on both pine and *Ribes* in Fillmore County. About a dozen trees were infected, half of which had already been killed. The infection dated back to about 1931. Appro imately 40 percent of the infection on *Ribes* was in the telia stage with 3 percen of the leaf surface and 1 percent of the bushes infected. In Medina County, Ohio, infection was reported on *Ribes* for the first time. Throughout the region, rust has been found abundant on *Ribes*, and new locations of rust on pine within the known range of present infection are numerous. In the Southern Appalachian region the rust was found for the first time in Calvert County, Md., on wild *Ribes*, and in Pocahontas County, W. Va., on white pine. The infection in Pocahontas County was mostly on 1935 wood and several young trees, from 1 to 2 feet in height, were dead or dying. Approximately 20 trees were examined.

Girl scouts continue Ribes eradication in Virginia.--Girl scouts from Camp May Flather in the George Washington National Forest, who performed some *Ribes*-eradication work earlier in the season, continued to take an active interest in this work. A total of 92 girls worked on *Ribes* eradication at various times in July and August. Crews were organized with a foreman and from 4 to 7 girls. They put in 276 hours of labor and destroyed 840 wild gooseberry bushes. This is the third season in which the girls have cooperated in control work. An illustrated article entitled, "Girl Scouts Go Forth to Serve in Conservation Work," was published in *The American Girl* for July 1939. This article, which describes the work of the girls in helping to protect the white pines against blister rust, was written by Mrs. Ruth Taylor Myers, Nature Counselor at Camp May Flather.

Forest fires handicap blister rust control operations in West.--During the latter half of July serious forest fires broke out in California and the extremely favorable fire weather caused by the excessive heat and low humidity made their control very difficult. On the Shasta, Lassen, Plumas, and Sierra National forests and in the vicinity of Yosemite and Sequoia National Parks, fires raged for 10 days. All available blister rust workers were on fire duty during this period. *Ribes* eradication, especially in the National Parks, was seriously handicapped by these forest fires and dangerous fire weather, the worst experienced in California in the last 30 years. Fire conditions were materially reduced during the latter part of August because of sporadic showers and a general rise in humidity over the entire timber belt. It is hoped that control work during the month of September can be carried on without frequent interruptions for fire-suppression duty. H. E. Swanson, in charge of blister rust control work in the Northwestern States, reports that the fire situation became serious in that region in the latter part of August, with the entire Kaniksu blister rust force of both the Forest Service and the Bureau of Entomology and Plant Quarantine being called out on a 7,000-acre fire. Fortunately, this fire as yet has done no appreciable damage, while on the other hand it has accomplished some good by reburning parts of a 1926 burn in Kalispell Creek which was scheduled to be snagged and burned sometime in the future. The fire was stopped on all fronts before it penetrated green timber.

New areas of Berberis canadensis found in Indiana.--During the last 3 months more than 67,000 *Berberis canadensis* bushes have been located and destroye in Pulaski and White Counties, Ind. Stanley Castell, in charge of barberry eradi cation in this State, points out that the 7 new areas of infestation have all been located on the banks of tributaries to the Tippecanoe River. The infestations were found during the regular course of the intensive survey being conducta with security wage earners in these counties. Salt brine was used for treating the bushes.

Destruction of barberry bushes in Ohio since January 1.--Harry Atwood, State leader in charge of barberry eradication in Ohio, reports that since January 1 an intensive survey has been made of about 4,000 square miles of area in Auglaize, Clinton, Darke, Fayette, Madison, Ross, Highland, Brown, Pickaway, and Fairfield Counties, and that a total of 4,333 barberry bushes have been destroyed. A preliminary survey was made in these counties during the period 1921-24, and many of the planted bushes removed. As a result of the intensive work conducted this year, 109 new properties have been found to be infested with barberry bushes. Only 7 percent of the old properties on record were found to have bushes when inspected during the course of the intensive survey.

Losses from stem rust estimated as negligible in 1939.--Preliminary estimates of losses from stem rust in 1939 indicate that the loss to wheat did not exceed a trace, or trace plus, in any of the States participating in the barberr eradication program, with the exception of Virginia and West Virginia, where barberry bushes are still numerous enough to be responsible for local spreads of the disease. The loss to barley exceeded a trace only in North Dakota, where there was a considerable number of late, heavily rusted fields, and where the average loss may have been as much as 1 percent. More than a trace of loss to oats has occurred only in Wisconsin, Indiana, and Virginia. The loss to rye was a trace or zero. In the physiologic-race survey a total of 393 isolations from 326 collections made in the United States and Mexico have been identified to August 28. Thus far race 56 has not been found in rust material identified from southern Mexico. From 33 collections 44 isolations were made, with races 38 and 59 the most prevalent, as in past years. From 25 collections made in northe Mexico there were 37 isolations, including races 17, 38, 56, 49, 11, 19, and 139. A total of 312 isolations have been made from material collected in the United States, including 267 uredial isolations and 45 from aecial material. In addition, about 300 cultures are now in process of isolation and identification. The results thus far available indicate the continued prevalence of race 56 in the United States, with race 38 second in prevalence. These two races comprise 82 pe cent of the total uredial isolations thus far made. Nine different races have been isolated from uredial material, while 11 different races have been identified in aecial collections. In the case of aecial material, race 56 is followed in prevalence by race 17. Of 142 aecial collections successfully cultured, 162 varietal isolations have been made; in other words, two varieties of *Puccinia graminis* have been identified in each of 20 collections. These included 75 isolations of *P. graminis tritici*, 51 of *P. graminis secalis*, and 30 of *P. graminis avenae*. Observations made during the first week of August for fall infection of stem rust indicated that Hordeum jubatum was commonly infected with stem rust in the uredial stage between St. Paul, Minn., and about Moberly, Mo. South of this point no Hordeum was found along the route through Missouri, north-central Arkansas, Oklahoma, and thence to San Antonio, Tex. Some fields had been plowed in Oklahoma and a considerable number in northern Texas, so that volunteer growth could be expected following adequate rainfall. With the appearance of volunteer grasses or grains in the South, and the late rusting of Hordeum in the Northern and Central States, all that would be required for rust infection farther south is north-to-south wind movement.

COTTON INSECT INVESTIGATIONS

Relation of environment to hibernating pink bollworm larvae.--With assistance from the Division of Pink Bollworm and Thurberia Weevil Control, L. C. Fife conducted experiments during July and August 1939 at Brownsville, Tex., to obtain information on the formation of long-cycle or hibernating larvae in relation to the field clean-up. Green and open cotton bolls were collected on July 25 and left in different environments in the field until sufficient time had elapsed to be certain that the remaining larvae had entered the diapause. The bolls were then examined between August 22 and 31. No long-cycle pink bollworms were found in 2,300 green bolls removed from the plants, 800 of which were placed on the surface of the soil and 1,500 buried 3 to 4 inches below the surface. In 100 green bolls on stalks cut and scattered over the surface of the soil no long-cycle larvae were found, but some larvae were found in 200 green bolls on stalks that had been cut and piled the same day. No long-cycle larvae were found in 800 open bolls placed on the surface of the soil exposed to the sun, but larvae were found in open bolls placed on the soil surface in the shade of rank-growing cotton plants, open bolls buried 3 to 4 inches deep, and in open bolls on stalks cut and scattered over the soil surface or placed in piles. In the 4 environments where green bolls were used, long-cycle larvae were found only in the bolls where the stalks with the green bolls were piled. In 5 environments where open bolls were used, long-cycle larvae were found in all cases except where the bolls were picked from the plants, and placed on the surface of the soil, exposed to the sun. Only enough bolls were examined to determine the presence of live larvae as the infestation was too low to make accurate counts of the numbers of larvae used or to attempt to determine the percentage of larvae entering the diapause under different conditions. The mean maximum temperature for August was 90.6° F., with precipitation on 9 days. No cages were used, but the soil beneath the experiments was examined to a depth of 3 to 4 inches between September 6 and 13, to determine whether the high temperatures or other conditions had caused the larvae to leave the bolls and enter the soil. No live larvae were found in the 45 square yards of soil examined. The experiments definitely show that long-cycle pink bollworm larvae were found in the lower Rio Grande Valley as early as the latter part of July.

Boll weevil control on Sea Island cotton.--In a boll weevil control test which C. S. Rude is conducting in a 5-acre field of Sea Island cotton at McIntosh, Fla., nine treatments or methods of control are being used. The plots are 1/20 acre in size and each treatment is replicated four times. Between August 2 and 17 three boll weevil infestation counts were made in each plot at 7-day intervals with the following results:

Treatment	Average infestation, August 2-17, 1939 Percent
Pre-square mop followed by calcium arsenate dust after 10-percent infestation	36.5
Spraying with calcium arsenate in water after 10-percent infestation	39.3
Calcium arsenate dust after 10-percent infestation	40.8
Pre-square dust with calcium arsenate followed by calcium arsenate dust after 10-percent infestation	43.4
Calcium arsenate-sulfur 50-50 after 10-percent infestation	51.0
Spraying at 7-day intervals with calcium arsenate-syrup starting with pre-square stage	73.9
Mopping at 7-day intervals with lead arsenate-syrup starting with pre-square stage	76.1
Spraying at 7-day intervals with lead arsenate-syrup starting with pre-square stage	79.4
Untreated check plots	82.9
Mopping at 7-day intervals with calcium arsenate-syrup starting with pre-square stage	84.0

It will be noted that so far as boll weevil control is concerned there is little difference in the first four treatments.

Low cotton flea hopper infestations do not justify control measures.--K. P. Ewing and Charles R. Parencia report concerning a series of cotton flea hopper control experiments completed in Calhoun County, Tex., by August 23, 1939. The cotton flea hopper infestations in this area were lower than any previous year since investigations have been conducted in the vicinity of Port Lavaca, Tex. The infestation was about normal early in the season but increased very slowly and did not reach the point where control measures are usually recommended (25 per 100 terminal buds) until during the latter part of May. Experiments with insecticides were started at that time, as planned, but the infestation did not increase as it usually does. The peak was reached during the week ended June 10, with an average of only 62 flea hoppers per 100 terminal buds in the untreated plots, or about half of the usual numbers for this section. Beginning with the week ended April 29 and including the week ended July 8, 1939, the average number of flea hoppers for 100 terminal buds was as follows: 7, 16, 18, 32, 37, 37, 62, 48, 47, 30, and 9. The insecticides tested were: (1) 1 part of calcium arsenate to 2 parts of ground sulfur dust, (2) 1 part of calcium arsenate to 2 parts of micronized sulfur dust, (3) ground sulfur, (4) micronized sulfur, and (5) wettabl micronized sulfur as a spray. All experiments received at least 3 effective applications. Tests were conducted, comparing each material applied in the early morning and at midday. The infestation was so low that in most of the tests there were no significant gains or differences in yields. The results from these tests emphasize the fact that light infestations of cotton flea hopper do not cause any significant reduction in yield.

Pink bollworm infests okra in Cameron County, Tex.--L. C. Fife reports that from August 14 to 19, 1939, with assistance from the Division of Pink Bollworm and Thurberia Weevil Control, okra pods from 16 farms near Brownsville, Tex. were examined for pink bollworm. The size of the okra fields ranged from about 1/2 acre to 33 acres, totaling 73 acres. The pink bollworm (Pectinophora gossypiella (Saund.)) was found in 2 fields and Crocidosema plebeiana Zell. was found in 9 fields. In the 1,769 okra pods examined, 2 pink bollworms and 19 C. plebeiana were found. Additional examinations of 1,339 pods were made from September 11 to 16, and 16 larvae were found, of which 12 were identified as pink bollworms and 4 as C. plebeiana. In the August examinations the highest infestation was 1 percent, but 6 percent of the pods were found infested by the pink bollworm in 1 field in the September examination, not including exit holes, which could not be definitely attributed to this species. The feeding signs and exit holes of C. plebeiana seem to be identical with those made by the pink bollworm and the mature larvae are easily mistaken for pink bollworm. The first examinations were made from okra adjacent to cotton fields which contained a few green bolls, but most of the cotton had been destroyed when the second examinations were made. The determinations were made by C. Heinrich.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

The situation in south Texas and the lower Rio Grande Valley of Mexico.--At the close of August the south Texas pink bollworm regulated area consisted of the lower Rio Grande Valley district, comprising the counties of Cameron, Hidalgo, Willacy, and Starr, and the area referred to as the Coastal Bend, embracing the counties of Kleberg, Nueces, Brooks, and Jim Wells. These areas were brought under regulation on account of pink bollworm infestation in 1936 and 1938, respectively. Gin-trash inspection from the 1939 cotton crop revealed a heavy pink bollworm infestation along the Rio Grande in the southern part of Cameron County, and lighter infestation in all other counties under regulation. During August incipient infestation was also found in the counties of Duval, Jim Hogg, La Salle, Maverick, Webb, and Zapata, lying just outside of the regulated area. The harvesting of the cotton crop was well advanced in the lower valley district by the first of August, and clean-up of cotton fields began in that area during the second week of that month. For the purpose of handling the clean-up program, the south Texas regulated area has been divided into 3 zones, in accordance with the degree of infestation. (1) The heavily infested area, which includes a strip of land approximately 5 miles wide extending from the Hidalgo-Cameron County line west to the salt flats on the east, comprising approximately 12,000 acres. (2) The generally and substantially infested area, comprising the remainder of Cameron County from the north line of the extremely heavily infested area to the Willacy County line, with the exception of a small area in Cameron County north of the "North Floodway," and, in addition, the south eastern corner of Hidalgo County. This area comprises approximately 45,000 acre of cotton. (3) The lightly infested area, comprising that portion of Hidalgo County not included in zone 2, that part of Cameron County not included in zones 1 and 2, and all of Willacy, Starr, Kenedy, Kleberg, Brooks, Jim Wells, and Nueces Counties. Individual bales of cotton from zone 1 contained a very high pink bollworm infestation, usually in excess of 100 worms, and in 1 case more than 1,000 specimens were taken from trash from a bale originating in 1 of the most heavily infested fields. As a rule, single samples of trash from zone 2 yielded from 25 to 100 pink bollworms. In zone 3, the infestation was very light, only a few worms being found in each county, and in Starr County only 1 specimen was found. The sum of $460,000 was made available to carry out Federal participation in pink bollworm control in south Texas. The deadline set by this Division for all living stalks to be removed from fields in the lower valley counties, which constitute the early maturing section, is September 15, and in the counties comprising the Coastal Bend stalks must be destroyed by October 1 in order for farmers to receive financial aid from the Federal Government for this work. Intense clean-up measures are being carried out in the heavily infested strip in Cameron County along the Rio Grande. Stalks are cut, raked into windrows, and piled so as to be burned effectively. In a few of the most heavil infested fields stalks are cut with machetes to prevent shattering of bolls, and the debris and any shattered bolls and locks are hand-picked from the ground and placed on the piles, after which all is burned. Our objective is to rake and pile the stalks within a few hours after cutting, and this is usually accomplish Somewhat less drastic measures are required for the generally and substantially infested area and the lightly infested area, where the clean-up requirements procedure is the same. In these zones control measures consist of cutting the cotton stalks (unless they are small enough to plow under) and plowing the roots out, so as to prevent future growth on which the pink bollworm might propagate. Stalks in all zones growing on ridges, turn-rows, or other inaccessible places, are grubbed out. At the close of August very satisfactory progress had been mad in all areas. Only a few hundred acres of stalks remained to be cut from approx mately 12,000 acres in the heavily infested zone, and indications were favorable for completion of the work in the lower valley counties, except where unusual circumstances may exist, by September 15. Good cooperation is being given in al areas. Cooperative stalk-destruction work in the lower Rio Grande Valley of Mexico was begun on August 10, 11 inspectors from this Division, and a number of cars, being assigned to the Mexico area to assist in the clean-up campaign. Measures employed by the Mexican Department of Agriculture for the destruction o stalks in the lower valley region are practically the same as on the American side of the Rio Grande. The heaviest pink bollworm infestation in Mexico was found in the Matamoros area along the Rio Grande opposite the heavy infestation in Cameron County, and a light infestation was found in the Reynosa section. Excellent progress had been made in the clean-up work in the Mexico area at the close of August, and farmers are giving whole-hearted cooperation.

Pink bollworm quarantine extended to include okra.--Following the finding of a light pink bollworm infestation in two okra fields in the Brownsville area of the lower Rio Grande Valley district in August, a quarantine proclamation was issued by the State Department of Agriculture on August 28, placing certain restrictions on the movement and production of okra.

Thurberia-plant eradication.--During the last week in July a recheck of the Tortillita Mountains for Thurberia plants was begun. This area was previous worked in 1935 and 1936, when Thurberia plant eradication was first begun in southern Arizona, and it was thought expedient to go over this area again at this time for the purpose of determining whether or not seeds had since sprouted or mature plants had been overlooked. An average of 100 W. P. A. workers were maintained throughout August. This territory is extremely rough and difficult to cover; notwithstanding, 10,360 acres were covered in August and 271 Thurberia plants destroyed, most of which were seedlings.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Metaldehyde effective as snail and slug poison.--Rodney Cecil, of the Ventura, Calif., laboratory, reports that an experiment with metaldehyde against snails and slugs disclosed that this material is very effective against these pests under the conditions existing in the Ventura area. The material, consisting of a proprietary mixture composed of 2 percent of metaldehyde and 98 percent of inert material, was spread in a 2-inch strip on a sidewalk 25 feet in length, flanked by 2 strips of lawn each 25 feet square. During the period April 18 to 28, inclusive, 775 snails and slugs were attracted and killed by this poisoned bait.

Tobacco moth larvae survive winter in pack houses of North Carolina.--J. P. Vinzant and W. D. Reed, of the Richmond, Va., laboratory, report that larva of the tobacco moth survived the winter of 1938-39 in scrap tobacco and in crevices of the walls and timbers of growers' pack houses in North Carolina. Tests to determine the possibility of winter survival of eggs and pupae under natural out-of-door conditions gave negative results. Prolonged exposure to cold killed 100 percent of the eggs, however, and such moths as emerged from pupae exposed to winter temperatures were malformed and weak. Limited surveys of widely separated areas in North Carolina and Virginia disclosed that the tobacco moth overwintered and emerged on most of the farms observed as being infested in 1938. It was found also that very few of the tobacco growers had thoroughly cleaned their pack houses of tobacco, and early in June larvae of the first generation of Ephestia elutella Hbn. were found in scrap tobacco on several farms. Spring emergence of adults of E. elutella began in the pack houses during the week ended April 21 and the peak of abundance occurred during the period May 19 to 26. It now seems probable that the tobacco moth will be found this season on many of the farms known to be infested in 1938.

Insecticide treatments against bean leaf beetle not practical.--L. W. Brannon, of the Norfolk, Va., laboratory, reports that preliminary results of an experiment conducted on the spring crop of snap beans to determine the relative effectivens of various insecticides for the control of the bean leaf beetle indicate that the treatments, although they proved highly toxic to the insect, were of no practical value, as the plants outgrew the severe foliage injury present during the early stages of plant growth. Results of field examinations to determine the percentage of dead adults of Cerotoma trifurcata (Forst.) on 3 feet of bean row on each of the plots 24 hours after the first application of the insecticide demonstrated that a spray containing cube root, pyrethrum, and sulfonated castor oil and a dust mixture composed of cube containing 0.5 percent of rotenone plus pyrethrum flowers, with sulfur as a diluent, were highly toxic to the insect. The results of these experiments indicated also that sulfur was much more effective than talc as a diluent for cube root powder in the control of the bean leaf beetle.

Longevity of winter survival of sweetpotato weevil adults.--As the result of extensive observations by K. L. Cockerham and O. T. Dean, of the Sunset, La., laboratory, it was found that adults of *Cylas formicarius* (F.) lived for a maximum period of 144 days during the winter of 1938-39 when confined in cages without food. Moreover, it was revealed that during the spring period existing from April to June 1939 the adults lived for periods ranging from 35 to 50 days in cages without food. In the series of experiments it was shown that the mortality of adults at Houma, La., 140 miles south of Sunset, was no greater than those confined in cages at the latter point. The survival of weevils was not prolonged when the cages were protected from direct precipitation, as compared to cages where precipitation was allowed to enter; neither was it prolonged in cages on clean soil in fields nor in cages filled with dry grass. The females lived for longer periods than did the males without food. It appears that the optimum environment for longevity without food consists of a natural growth of grass and weeds which occurs typically on headlands or along fences in the weevil-infested territory. Records made on 25,000 to 30,000 sweetpotato weevil adults, carried over during the winter of 1938-39 in cages and in the insectary, indicated that the degree of natural mortality when sweetpotatoes were suppled as food reaches at least 75 percent.

Efficiency of rotenone-dust mixture against turnip aphid not improved by conditioning agents.--An extensive series of field tests performed by P. K. Harrison, of the Baton Rouge, La., laboratory, demonstrated that the efficiency of the standard rotenone-dust mixture against *Rhopalosiphum pseudobrassicae* (Davis) was not improved by the addition of various conditioning agents. These experiments were performed on broadleaved mustard and white-tipped radishes. The experimental series involving mustard received 3 applications of the various insecticidal mixtures at 2-week intervals beginning on March 8, whereas in the radish experiments 2 applications were made on March 24 and April 7, respectively. A total of 20 different dust mixtures were used in each experiment, involving the use of dilutions of 1.0 and 0.5 percent of rotenone, respectively. Equal parts of tobacco dust and dusting sulfur, or talc, were used as diluents. Various conditioning agents were used in 16 of these dust mixtures, such conditioning agents consisting of 1 or 2 percent of peanut oil, 4 percent of soybean flour, and 1 percent of the following: peanut butter, cottonseed oil, pine oil, oleic acid, sulfonated castor oil, sodium oleyl sulfate, or an alkylated naphthalenesulfonate. Critical analysis of the resulting data, with respect to yield of the mustard and radishes, demonstrated that there were no significant differences in yield between these treatments, indicating that the present standard recommendation for turnip aphid control, consisting of a rotenone-dust mixture containing 1 percent of rotenone with equal parts of tobacco dust and sulfur is not appreciably improved by the addition of any of the more common conditioning agents used commonly in combating aphids.

Tolerance of tuberose to hot-water treatments.--As a result of tests with hot water for the control of the bulb mite on tuberose, C. A. Weigel and G. V. Johnson, of the Beltsville, Md., laboratory, report that, on the basis of bulb production, yields on treatments with hot water at temperatures of 124° and 126° F. for 30 minutes during 1938 showed an increase over the planting weight. Some of this stock also was treated at temperatures of 126°, 128°, and 130° during the 1937 season. The 1937 and 1938 untreated bulbs, however, produced the greater percentage of size No. 1 flowering bulbs and the greater weight increase.

Data on biology of potato psyllid.--R. L. Wallis, of the Scottsbluff, Nebr., laboratory, reports that thorough examinations of the red cedars in the canyons south of Scottsbluff during mid-April failed to disclose the presence of Paratrioza cockerelli (Sulc.). It was apparent that the psyllids had left their overwintering headquarters, as they were first found in the cedars in this locality. Since the principal wild host plants, groundcherry and buffalo bur, were not up at this time of the year, it is conjectural where the psyllids spend the intervening period between their movement from the overwintering host plants and their early season breeding on the wild host plants. During the period ended June 30 a continuation of field work in the North Platte Valley near Scottsbluff and Torrington, Wyo., demonstrated that groundcherry is more important as a wild host plant of the psyllid than is buffalo bur; that the earl planted potatoes carry higher psyllid infestations than do the wild host plants or tomatoes or late-planted potatoes; and that potatoes planted during the latte part of June were infested by the psyllid to only a slight degree.

Flight of wireworm adults.--E. W. Jones, H. P. Lanchester, and K. E. Gibson, of the Walla Walla, Wash., laboratory, report that the females of the Pacific coast wireworm (Limonius canus Lec.) and of the sugar beet wireworm (L. californicus (Mann.)) were not observed to take flight in the Walla Walla distri this season until after most of their eggs had been deposited. These observers found that the female of L. canus will deposit approximately 90 percent of her eggs in the soil immediately after mating and when taken in flight after this pe iod her ovaries are nearly all if not entirely spent. Collections of L. californicus adults under traps placed on the soil surface demonstrated that in this part of the wireworm territory at least this species lays most of its eggs before any flight occurs. In the Parma, Idaho, district, however, F. H. Shirck found that the L. californicus females make migratory flights of considerable extent with about one-third of their egg quota retained in the ovaries.

Entomogenous fungi kill wireworms.--F. H. Shirck, of the Parma, Idaho, laboratory, reports that two types of entomogenous fungi supplied to him through the cooperation of L. P. Rockwood, of the Forest Grove, Oreg., laboratory of the Division of Cereal and Forage Insects, have given promising results against the sugar beet wireworm. One type of fungus, Metarrhizium anisopliae (Metsch), was obtained from a fungus-killed wireworm originally sent to Mr. Rockwood from Parma. Experimental work showed that the wireworms exposed to this fungus showe a slight increase in percentage of mortality over the check insects. The second type of fungus, however, designated as Metarrhizium n. sp. (?) (Drab) and originally cultured by Mr. Rockwood from a diseased wireworm found near Forest Grove, gave a 35-percent kill, as compared to the check insects. So far as is known, the latter type of fungus does not occur naturally in Idaho. It seems significant, therefore, that this latter type of fungus apparently possesses greater virulence for wireworms native to Idaho than does the native fungus.

INSECTS AFFECTING MAN AND ANIMALS

Changes in field laboratories.--A reduction in funds for the fiscal year 1940 has necessitated a discontinuance of the Division's field laboratories at Ames, Iowa, and Valdosta, Ga.. The work on cattle grubs, which has been carried out at the former laboratory, is being transferred to the Dallas, Tex., laboratory, while the investigations on horse bots are being discontinued for the present. R. W. Wells, formerly in charge of the Ames laboratory, and H. O. Schroeder are being transferred to Dallas to continue the work on cattle grubs. S. W. Simmons, who was associated with Messrs. Wells and Schroeder at Ames, is being assigned to new duties on the dog fly investigations with headquarters at Panama City, Fla. A. L. Brody, formerly in charge of the Valdosta, Ga., laboratory, is being transferred to Panama City, Fla., where he will be in charge of research work on the dog fly and Gulf coast tick. E. E. Rogers and E. B. Blakeslee, associated with Dr. Brody at the Valdosta laboratory, are also being transferred to Panama City. The work on screwworms in the Southeast, which was being carried on at Valdosta, will be discontinued.

Investigations of eye gnats (Hippelates spp.) discontinued.--On September the investigations of eye gnats, which have been carried on by J. T. Bigham at Orlando, Fla., for the last 2 years, were discontinued. Mr. Bigham is being transferred to the Division of Domestic Plant Quarantines.

FOREIGN PLANT QUARANTINES

Miss Belmont retires.--On August 31 Miss Muriel E. Belmont was retired on account of ill health. She entered the service of the Federal Horticultural Board on April 2, 1923, by transfer from the War Department. For several years she was connected with the Import and Permit Section of the Division of Foreign Plant Quarantines. In recent years she was engaged in clerical work in connection with export certification and certain other port activities. Miss Belmont always displayed a keen interest in her work and leaves behind an enviable record of loyalty and efficiency.

Mangoes washed ashore near San Diego, Calif.--During the early part of July reports came in of fresh mangoes washing up on the beach north of San Diego. The following 8 days were spent in recovering these fruits with help from the County Agricultural Commissioner's office. Approximately 18,000 fruits were picked up and burned, using old automobile casings for fuel. The fruit had been jettisoned off the coast by vessels that had been tied up by labor troubles in Mexican ports and were unquestionably fruits grown in Mexico. No infestation of fruit fly was found in the fruits examined.

Customs guard frustrates attempt to smuggle plant material.--On the afternoon of May 25 an American yacht arrived at Miami, Fla., from Georgetown, Cayman Islands, British West Indies. About 9 p. m. Customs Guard A. H. Malcolm caught the steward of this yacht attempting to smuggle ashore the following plant material: 272 mangoes, 11 sapodillas, 20 cocoa plums, 52 palm seeds, 5 banana plants, 7 citrus trees, 5 breadfruit, 1 pound tamarind fruit, 17 coral vine seed. 7 orchid plants, 7 crapemyrtle plants, 1 water-hyacinth plant, and 12 unknown plants. All of this plant material was confiscated and a fine of $38.10 was assessed against the steward. A fine of twice that amount was assessed against the master of the vessel and the steward was ordered bound over to the Federal grand jury under a $250 bond by the United States Commissioner. When this case came to trial on August 7 the steward pleaded guilty and was ordered to pay an additional fine of $15.

Potato virus complex in South America.--Of 59 potato varieties collected by an English expedition to Lake Titicaca, cradle of Peruvian civilization, and tested for virus diseases, only 11 were found to be disease free. In 6 Peruvian potato varieties, viruses or virus complexes were discovered whose reactions could not readily be interpreted in terms of the known potato viruses. Viruses apparently identical with those known in England as X,B,C,F,G, and perhaps leaf roll were found also in the 48 diseased varieties. This information is from an article by R. G. W. Dennis, of the Potato Virus Research Station, Cambridge, England, in the Annals of Applied Biology for February, 1939 (26:87-101). Mr. Dennis concludes by stating, "It follows that great caution should be exercised in introducing South American varieties into potato-growing districts." The fact that 6 unidentified virus diseases were found by a single expedition to 1 area in South America emphasizes the necessity for preventing entry of potatoes from that part of the world unless under rigidly controlled conditions.

Entomological interceptions of interest.--A living larva of the fruitfly *Anastrepha suspensa* (Loew) was intercepted at New York on May 15 in a bitter orange in baggage from Puerto Rico. A living adult of the chrysomelid *Calligrapha notatipennis* Stal was taken at Laredo, Tex., on February 18 on orchid foliage in baggage from Mexico. A living specimen of the pentatomid *Euschistus obscurus* (P. B.) arrived at Brownsville, Tex., on May 4 on a snapdragon in baggag from Mexico. Living adults of scolytid *Xyleborus kraatzi* Eichh. were intercepted at San Pedro, Calif., on May 3 in sugarcane in baggage from Hawaii. Six living larvae of the bean pod borer (*Maruca testulalis* Geyer) were collected on February 24 in pods of *Dolichos lablab* in the field at Asan, Guam. Two living adults of the tenebrionid *Scleron ferrugineum* (F.) were intercepted at Honolulu, T. H., on May 13, 1938, with debris from orchid plants in baggage from the Dutch East Indie Living specimens of the coccid *Gymnococcus agavium* Dougl. were taken at San Francisco on April 31 on a plant of *Agave* sp. in the mail from Mexico. Living adults of the labiids *Prosparatta humilis* Hebard and *Sparatta pulchra* Borelli were found at Philadelphia on March 28 under the loose bark of logs (*Tabebuia donnell-smithi* in cargo from Guatemala. Three living adults of the coccinellid *Epilachna defect.* Muls. arrived at Galveston, Tex., on May 15 with banana debris in cargo from Mexico. Living specimens of *Mirotermes* (*M.*) *panamaensis* Snyder were intercepted at New Orleans on March 1 in mahogany logs in cargo from Panama. A living adult of the garlic weevil (*Brachycerus algirus* F.) was taken at New York on October 20, 1938, in a garlic bulb in cargo from Italy. Three living larvae of the pink bollworm (*Pectinophora gossypiella* Saund.) were intercepted at Washington, D. C., on March 21 in cottonseed in the mail from Ethiopia via Italy.

Pathological interceptions of interest.--*Bacterium citri* (Hasse) Doidge was intercepted at Philadelphia August 7 on a lemon in ship's stores, the origin being given as Spain (?). *Cercospora musae* Zimm. was intercepted August 4 at Boston on banana leaves from Cuba. *Chrysomyxa rhododendri* (DC) DeBy. was intercepted July 13 and again August 1 at Washington on rhododendrons from Switzerland. With the coming of the fall-bulb-importing season, interceptions of *Ditylenchus dipsaci* (Kuhn) Filipjev on various bulbs from Europe were made but few data are available as yet. *Tilletia horrida* Tak. was intercepted at New York on June 7 in paddy rice from Dutch East Indies. *Vermicularia liliacearum* Westd. was prominent on leaves of a shipment of *Iris germanica* varieties from France inspected on August 29 at San Francisco.

DOMESTIC PLANT QUARANTINES

Grasshopper survey under way.--August work on the grasshopper control project included a survey of adult grasshoppers in the infested regions. Areas infested with the migratory species were divided into five districts, each with a center for local assembly of data and forwarding to the Minneapolis field headquarters office. Sixty-eight men participated in the work in addition to the technical adviser, five coordinators, and five clerks. Conferences are now to be held with State leaders to designate the areas of probable infestation by the migratory species in 1940. Plans for a survey of grasshopper eggs in the various infested areas are now being worked out.

Fall grasshopper baiting.--In the areas of long-winged grasshopper infestations, Federal baiting activities had been discontinued for the season by the last of August in the infested areas comprised of the contiguous parts of Texas, New Mexico, Kansas, and Oklahoma, and the baiting of egg-bed concentrations of this species in southeastern Colorado was nearing completion. Few egg beds of this species could be found in the above infested States, the population having been greatly reduced by the control activities of the last two seasons. The second generation of the lesser migratory species appeared in the Texas and Oklahoma Panhandles and contiguous area in Kansas, and baiting was resumed in the area for the protection of fall wheat. The second generation of this species was also reported in southeastern Nebraska and south-central South Dakota. Baiting in the Mississippi Valley was brought to a close about the first of September

Roadsides baited for hopper control.--Federal roadside baiting for concentrations of the lesser migratory grasshoppers was conducted in August and continued in September in the "flight areas" of Montana and Wyoming, while in Minnesota the State Highway Department took up the work on roadsides in areas where farmers had recently baited lands for the protection of their crops. Federal crews spread bait in September on roadsides in the Oklahoma Panhandle for control of the heavy population of second-generation hoppers in the nymphal stage.

Merits of fall grasshopper baiting tested.--Experimental control in reducing potential infestations by baiting grasshoppers in the fall, before eggs are deposited, is under way at Stanford, Judith Basin County, Mont., an area of 18 sections having been selected for this experiment. Roadsides and idle land are being spread with bait by Federal workers, while the farmers spread their lands with bait delivered by the Bureau and mixed by county or State workers. Farmers are enthusiastically participating in the work. The entire area has been covered once with good results and further baiting will continue. This area, which was one of the latest to be invaded by flights of hoppers, has a population of these pests ranging from less than 1 per square yard in stubble to 50 or 60 in the gree alfalfa, it is estimated, and some egg-laying has already taken place.

Mormon cricket control activities.--The fall survey of Mormon cricket infestations, both as to adult crickets and egg beds, was completed in August in the various infested States, and the State supervisors are now compiling the findings. The season's activities on the control of cricket infestations in the Rocky Mountain and Great Plains States were brought to a close by the middle of August, with the exception of a few days' work in Sheridan County, Wyo., where, according to a newspaper item, a snowfall of an inch and a half on August 9 in the Big Horn Mountains temporarily checked migrations of the crickets. The possibility of cricket eggs remaining viable in the higher altitudes of these mountains over a period of two seasons or two years is one of the factors under consideration in the control program.

New infestations of white-fringed beetle.--Two rather extensive areas of infestation of white-fringed beetles have recently been found, one of 4,883 acr in New Orleans in the vicinity of Lake Pontchartrain chiefly on uncultivated land; and another of over 4,000 acres in the Maybank-Lux, Miss., area in Forres and Covington Counties, along the right-of-way of the railroad leading to Hattiesburg, where beetles were located earlier in the season. Both *Pantomorus leucoloma* Boh. (formerly known as *Naupactus leucoloma* Boh.) and *P. peregrinus* Buch., formerly referred to as *Naupactus*, new species, infest this area. Of lesser extent were the infestations recently found at Opp, Covington County, Al on the grounds of a school and of a church. Adjoining cultivated area was apparently free of the beetle; at Blakely Island, across the river from Mobile, Ala., involving approximately 150 acres of waste land and dry docks; and the incipient infestations at Biloxi, Miss., and Crestview and De Funiak Springs, Fla. All the above areas, except the infestation in Forrest County, Miss., are in counties formerly known to be infested. A volunteer inspector was responsible for finding the beetles at De Funiak Springs, whereas a former laborer on the project reported the infestation at Opp, Ala. Regular inspectors discovered th other infestations. The Lake Pontchartrain area has been twice dusted by airplane. This is the only feasible method to employ over this uncultivated expanse, and the results have been good.

Cotton operations in white-fringed beetle area.--Methods of handling cotton in the various areas infested with the white-fringed beetle have been worked out with State officials, with the result that in such areas as Florala, Ala., ginning operations are restricted to points in the regulated area, whereas in areas where little cotton is produced such as Gulfport, Miss., the cotton is required to be fumigated before being ginned. Cottonseed may be moved to points outside the regulated areas only to designated oil mills equipped to han seed without danger of carrying infestation.

White-fringed beetle destroys beans in Chile.--According to the Director of the Agricultural School at Angol, Chile, who recently visited the National Museum in Washington, the white-fringed beetle is of particular importance in that country as an enemy of beans. Although the beetles are at times only sufficiently abundant to attract attention, they occasionally destroy the entir crop. The method of control is to hill up the beans when damage becomes apparent, then irrigate the field. The plants then develop new roots above the old ones and appear gradually to overcome the effects of the earlier feeding by th larvae.

Peach inspections nearing completion.--General orchard inspection for th phony peach and peach mosaic diseases has been completed, or is nearing completi as outlined for the year, in Alabama, Arizona, Arkansas, Colorado, Illinois, Maryland, New Mexico, North Carolina, Tennessee, Pennsylvania, and Utah. The work will be continued in California, Georgia, Louisiana, and Mississippi, as we as in South Carolina, where, in Spartanburg County, there is a rapidly growing peach industry and the growers are concerned in the protection of their orchards from the phony peach disease. In several southwestern States the nursery stock in the regulated area is being reinspected. This is in accordance with the provisions of the State quarantines requiring fall inspection before defoliation takes place. Two mosaic infections were found in August, in an orchard in the Redlands district of Mesa County, Colo., the first time the disease has been found in this district since 1936.

Peach inspection force reduced.--The field force employed on the phony peach and peach mosaic disease control project has been reduced from 97 regular employees in the latter part of July to 42 the latter part of August. This reduction of more than 56 percent is partially the result of the completion of the season's work in several States. The allotment of relief funds to the projects, in the current year, for the removal of diseased trees carries a provision that no trees ar to be removed from commercial orchards and nurseries with relief labor. State and grower participation, of which there has been a steady increase in recent years, will, it is hoped, contribute largely to the continuance of these programs. In the calendar year 1938, 22 southern States from the Atlantic to the Pacific, contributed to the work to the extent of $72,778.

Sweetpotato weevil survey.--August work on the sweetpotato weevil project included a survey of over 500 properties in counties outside the regulated areas in Georgia, Mississippi, and Texas. No weevils were found in the Georgia countie of Brooks, Colquitt, Echols, and Lowndes, nor in that part of Lamar County, Miss., which was surveyed. In Texas a survey of 461 properties in 43 counties, including a commercial area in eastern Texas, resulted in finding 3 infestations. Thes were located in Brazos County, a noncommercial area in which the soil is generally unsuited to sweetpotato production. Within the regulated areas of Alabama, Georgia, Mississippi, and Texas, 11 infested properties were located during the month and eradication and regulatory activities were carried forward. During the month 20 Federal and 19 State men participated in the work.

Sweetpotato weevils being eradicated from two Mississippi counties.--A systematic survey, based on seedbed inspections, has been completed in the quarantined areas of Jeff Davis and Lawrence Counties, Miss., with the result that no weevils could be found. This result was particularly gratifying in that infestations had previously been found on more than 100 properties in these areas, and approximately 400 growers are affected by the efforts of the last several months toward eradication. A survey for weevils is now being made of the parts of these counties outside of the quarantined areas.

Citrus-canker work.--The activities during August were concentrated principally in strip-working an area near Houston, Tex., and inspecting for citrus canker nearly 54,000 citrus trees on 2,000 properties in the area. A large number of *Citrus trifoliata* was found along the Houston Ship Channel and tributary bayous, where at one time it appears there was an effort to commercialize citrus growing. These trees, now found on old house sites and in pastures, were destroyed to the number of 49,000. In the city of Houston a house-to-house survey is being made of citrus trees, which are found growing on a large percentage of the properties. A record is maintained in the field headquarters office at Houston of the number and exact location of the citrus trees remaining in the noncommercial area of Texas where the more intensive work is carried on. In the 10 counties comprising this area there remained at the close of the last fiscal year, 184,995 citrus trees.

Three borer-infested shipments of corn intercepted.--Living larvae of the European corn borer, the larger corn-stalk borer, and the corn ear worm, were recently found in a carton of green corn consigned to Florida from a point on Long Island. The shipment was turned back by a transit inspector at New York City. Two shipments infested with the European corn borer and consigned to points in Maine were intercepted in Boston in August. All these shipments were also in violation of Japanese beetle quarantine regulations.

Japanese beetle quarantine violations reduced.--A noticeable betterment on the part of shippers in making their consignments in compliance with Japanese beetle quarantine regulations has been commented on in recent reports from transit inspectors at Philadelphia, Pa., Springfield, Mass., and Saint Paul, Minn. On comparing these statements with reports from all transit inspection points, it was found that the condition is general, 119 apparent violations having been intercepted in July of this year, as compared with 212 in July 1938.

Japanese beetles found in railway cars.--The inspection of cars of produce arriving at Chicago, Saint Paul, Cincinnati, Saint Louis, and Atlanta from the Japanese beetle area in July and August resulted in finding 15 live beetles in railway cars at Chicago.

CONTROL INVESTIGATIONS

Particle size of insecticide affects deposit.--In tests of the toxicity of coarse, medium, and fine fractions of paris green to Mexican bean beetle adults, E. R. McGovran and E. L. Mayer report that when equal amounts by weight of the three fractions of the insecticide were suspended in equal volumes of water and sprayed on glass slides a wide range of deposits resulted. The spray was applied with an atomizer-type spray. The spray mixture was held in a pint jar and agitated by a stirrer which rotated in a horizontal plane. The agitation was rapid enough to prevent any of the insecticide from settling on the bottom and slow enough so that no air bubbles were beaten into the spray; 1.25 grams of each of the three fractions of paris green were added to 100 cc. of water. Analysis of the deposits by C. C. Cassil, of the Division of Insecticide Investigations, revealed that the coarse fraction gave a deposit of about 70 micrograms per square centimeter, the medium 26 and the fine 14. The particles in each of these fractions were of rather uniform size so that practically all the particles in the coarse fraction were larger than any particles in the medium fraction and the same applied to the medium and fine fractions. In other words there was practically no overlapping in particle size between the fractions. Most materials used commercially as stomach insecticides in sprays are well pulverized and probably do not give such a wide variation in deposit as the three especially prepared fractions of paris green just discussed. However, with samples of experimental materials tested as insecticides there is sometimes a great difference in particle size between samples. Such differences in particle size may have influenced deposits as much or even more than was the case with these fractions of paris green, the deposit of which was five times as great with the coarse fraction as with the fine. With these facts in mind, it can radily be seen that the deposit and mortalities obtained in spray tests of this type might be dependent in a large degree on the particle size of the sample, as well as on its chemical composition.

Toxicity of Tephrosia.--In collaboration with A. F. Sievers, of the Bureau of Plant Industry, a study was made by W. N. Sullivan and J. H. Fales, of this

Division, of the toxicity of Tephrosia virginiana roots prepared by several methods. A series of acetone and chloroform extracts of this native legume were prepared and tested on houseflies by the turntable method. In the preparation of this material there was some question, however, whether extraction on a hot plate, removal of the solvent to determine the total extract, and similar procedures, whereby the extract is subjected to heat can be resorted to without reducing the toxicity of the extract as measured by tests on flies. A statistical analysis of the results of these tests shows that the differences in toxicity of these extracts are not significant as measured by the analysis of variance. It follows, therefore, that the conditions to which the extracts were subjected did not result in an appreciable destruction of the toxic substances present in the root. The results of this investigation are published in Soap (v. 15, No. 9, pp. 111, 113).

INSECTICIDE INVESTIGATIONS

Kenya pyrethrum.--E. Talbot Smith, the American Consul at Nairobi, Colony of Kenya, East Africa, in July, 1939, completed a report on the pyrethrum industry in that country which is of interest to all working with this important insecticide. Pyrethrum was first planted in Kenya in 1928 as an experiment and it was not until 1936 that the exports of pyrethrum were considered important enough to warrant a separate classification in the Colony's export statistics. Of the 1,980 tons of pyrethrum flowers, valued at $842,400, exported from Kenya during the 12 months ended March 31, 1939, the United States took 1,648 tons. The industry has grown rapidly and it is expected that by the end of 1939 12,519 acres will be under pyrethrum in Kenya. Where the soil is well drained, pyrethrum is now grown at altitudes from 6,500 to 9,000 feet above sea level. Mr. Smith's report gives details as to seeding, spacing, fertilizing, picking, cost of production, drying, grading, baling, analysis, and marketing. The yield per acre ranges from 300 to 1,100 pounds of dried flowers per annum. These variatio in yield are caused by differences in fertility of the soil, variations in rainfall, and other factors, the most important of which is the altitude at which grown. The higher the altitude the greater the yield. Insecticide manufacturer in the United States prefer Kenya pyrethrum flowers to those from Japan or Dalmatia, because of their high pyrethrin content. Only pyrethrum having a pyrethrin content of 1.4 percent or over is exported from Kenya. The export of pyrethrum from Kenya is a monopoly controlled by the Kenya Farmers' Association.

Eugenol in a commercial geraniol.--A sample of commercial geraniol, which in two seasons' tests at Moorestown, N. J., has proved unusually attractive to t Japanese beetle, is being subjected to a complete analysis by H. L. Haller and E A. Jones. In certain preliminary separations an appreciable amount of eugenol and some dehydrodieugenol, the latter as a zinc salt, have been found. Eugenol is not a normal constituent of the essential oils from which commercial geraniol is obtained. The presence of dehydrodieugenol, an oxidation product of eugenol, has not been previously reported in any essential oil.

Derris as a fumigant.--Recently in preliminary tests, L. D. Goodhue, of t Division of Insecticide Investigations and W. N. Sullivan of the Division of Control Investigations, have found that the smoke from certain burning mixtures of derris and potassium nitrate is very toxic to the housefly. Using from 4 to 8 ounces of derris per 1,000 cubic feet in a Peet-Grady chamber, kills of from

97 to 100 percent were obtained in all cases. An investigation is now under way to determine the proportions of derris or cube, nitrates, moisture, and other substances which will be necessary to give the maximum toxicity. This material will be tested for the control of greenhouse insects.

BEE CULTURE

Nitrite nitrogen test apparently not a specific test for Bacillus larvae.-- It was held until recently that B. larvae, the causative organism of American foulbrood, is the only organism that stores nitrites when cultured on special medium containing carrot extract without added nitrates. Consequently the appearance of a red color on adding sulfanilic acid and alphanaphthylamine acetate solutions as used in nitrite nitrogen tests, to a bacterial culture on this medium was taken as a specific indication of the presence of B. larvae. C. E. Burnside, of the Beltsville, Md., laboratory, however, recently encountered and isolated in apparently pure culture two spore-bearing organisms which appear to store nitrite on medium containing carrot extract in a manner similar to that of B. larvae. He states: "One of these gives a shade of red indistinguishable from the color produced by B. larvae, while the other one varies only slightly. Color reactions have been obtained in subcultures with both organisms, but the color is more intense in medium adjusted to about pH 7.0 than in more acid medium." Concerning a third organism that he was not successful in isolating, he states: "On four or five occasions a positive nitrite test has been obtained in cultures contaminated by a coccoid organism appearing singly in pairs or in short chains. No rods or other indication that B. larvae has grown in these cultures could be detected. It seems probable, therefore, that nitrite may have been stored by the coccoid organism. Although the testing solutions were poured off and the cultures washed with sterile water after about 30 minutes, the organism failed to grow in subcultures."

IDENTIFICATION AND CLASSIFICATION OF INSECTS

A weevil infesting canaigre in the Southwest.--In September 1938, J. S. Rogers, of Hide and Leather Investigations, Bureau of Agricultural Chemistry and Engineering, submitted tubers of canaigre (Rumex hymenosephalus) taken in New Mexico that were infested with large curculionid larvae. The infestation was sufficiently severe to cause some concern, as the canaigre is grown commercially for use in the preparation of tannin. The weevil larva could not be identified, nothing like it being available in the National Reference Collections. An attempt was accordingly made to rear adults, under quarantine conditions, and the first specimen was finally obtained on August 3, 1939, almost a year after collection. It was identified as a species of the genus Ophryastes, possibly O. tuberosus Lec. More material will be needed to establish its specific identity positively.

Useful addition to the collection of Coleoptera.--L. L. Buchanan has recently received from E. C. Zimmerman, entomologist at the Bishop Museum in Honolulu, for deposit in the National Collections, an exchange lot of South Pacific Rhynchophora, consisting of 59 species, of which 27 are represented by paratypes or cotypes. Most of the species are new to the Museum Collection.

Two South American weevils collected in the Southern States.--Among lots of Rhynchophora recently submitted for identification, were found specimens of 2

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species of Conotrachelus, evidently of South American origin, though neither one has yet been specifically named. One of them was collected at Mobile, Ala., by H. P. Löding, and at Spalding County, Ga., by T. L. Bissell; the other was taken at Baton Rouge, La., by G. E. Cox, and sent in by W. E. Anderson, State Entomologist of Louisiana. Both agree specifically with specimens of unidentified Argentine species in the Museum Collection. The discovery of these in Southeastern States is of considerable interest in view of the establishment in that region of certain other South American weevils, as the vegetable weevil (Listroderes obliquus Klug), and the white-fringed beetle (Pantomorus leucoloma (Boh.).

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